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From Climate Change Denial to Veganism:  
The Role of Environmental Minorities in Promoting  
Sustainable Practices

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### **Abstract**

Despite pro-environmental attitudes becoming increasingly popular over time, only a few people actually adapt their behavior accordingly, meaning people acting sustainably mostly remain a minority. While societal change was traditionally assumed to be predominantly caused by majorities, recent research suggests that minorities can be crucial in instigating change. This study investigates the influence of vegan minorities in a social context with or without an opposing minority. Three conditions were investigated with either a vegan present, a climate change denier, or both. We hypothesized that the presence of an opposing minority would increase the influence of the vegan minority, with value in diversity acting as a potential moderator. The sample includes 111 participants mostly from Germany. The results show that the vegan minority was not perceived as deviant, whereas the presence of the denier led to the group being perceived as polarized when opposing the vegan, but also when being the only minority present. Generally, the influence of both minorities on sustainable attitudes and intentions, vegan policy support, and vegan attitudes and intentions was not significant, nor moderated by value in diversity, as initially hypothesized. Value in similarity was not found to moderate the effect of the condition either, however the higher the value in similarity, the higher were sustainable and vegan attitudes, as well as support for vegan policies. Overall, the findings highlight the complex dynamics of minority influence in environmental contexts.

*Keywords:* minority influence, vegan, climate change denier, sustainability, value in diversity

## **From Climate Change Denial to Veganism: The Role of Environmental Minorities in Promoting Sustainable Practices**

To address the pressing challenges of climate change, significant behavioral changes are necessary (IPCC, 2023). The pathways to mitigate the climate crisis, as suggested by the IPCC Special Report (2018), include dietary adjustments to rely on less resource-intensive and more sustainable food sources. With livestock systems currently occupying almost 80 percent of farmland globally (European Commission, 2022), it is evident that a significant shift toward sustainable diets is essential. Although the awareness of climate change increases over time and attitudes towards sustainability are changing, it does not necessarily induce behavioral change (Venghaus et al., 2022). While some adapt their behavior to be more sustainable, the majority does not drastically change. An example of such behavior is eating a vegan diet, which was found to have a 70 percent lower dietary environmental impact compared to eating a diet high in meat (Scarborough et al., 2023). Nevertheless, most people continue to consume animal products regularly, and the worldwide consumption of meat even increased by 45 percent when comparing the years 2000 and 2020 (AOK, 2023). In contrast, some countries like Germany are seeing a decline in meat consumption and an increase in the number of vegans and vegetarians, though vegans still only make up about two percent of the population as of 2021 (BMEL), remaining a small pro-environmental minority. In this paper, the term environmental minority refers to individuals rejecting established majority norms regarding environmentalism. However, the question remains: When and to what extent can this vegan minority influence the majority to become more sustainable and change their diets?

In this context, it is important to recognize that besides pro-environmental minorities such as vegans, there is a minority on the other side of the spectrum: those who do not believe in climate change at all. In Germany, climate change deniers make up a total of seven percent of the population as of 2013, doubting that the climate is changing in the first place, or denying that humans are the ones causing climate change (Engels et al., 2013).

The effect of confrontation with deviant environmental minorities, such as those of climate change deniers and vegans, on individuals' attitudes and behaviors regarding sustainable practices remains relatively unexplored. This leads to the research question of this paper: How does the presence of environmental minorities at different ends of the spectrum (vegan and climate change denier) impact an individual's attitude and intention about sustainable behaviors, including veganism?

### **Why Minorities are Unlikely to Have Influence**

Majorities are influential due to the concept of conformity, where individuals adjust their attitudes, beliefs, or behaviors to align with group norms (Asch, 1956). This influence stems from a fundamental human desire for acceptance and the fear of social rejection (Cialdini & Goldstein, 2004). Historically, people tend to follow the majority (Asch, 1956) and generally feel socially justified in doing so (Moscovici & Lage, 1976), while minorities are generally less likely to have influence (Kurz et al., 2020; Minson & Monin, 2012). Minorities are especially unlikely to be influential and instead hamper societal change when they threaten the moral self-image of the majority (Kurz et al., 2020). The phenomenon of vegans being derogated for threatening non-vegans' positive self-view is called 'do-gooder derogation', which applies to minorities whose actions are motivated by virtuous principles (Bolderdijk & Cornelissen, 2022; Minson & Monin, 2012). This is particularly prevalent among those eliminating meat from their diet, leading meat-eaters to derogate vegetarians or vegans based on the expectation that those deviating from the norm see themselves as morally superior (Minson & Monin, 2012). This can result in backlash and resentment as meat-eaters feel morally judged by the minority for not aligning with their values (Minson & Monin, 2012). Similar effects were observed with other morally motivated groups like zero-wasters and sustainable innovators, where people were not inspired by the others' behavior but felt threatened in their moral self-concept (Bolderdijk et al., 2018). Not only does the do-gooder derogation not lead to positive behavior change, but it can even trigger responses in the opposite direction (Bolderdijk et al., 2018).

Moreover, according to self-categorization theory, individuals categorize themselves and others into social groups, thus forming an ingroup ('us') and an outgroup ('them') (Turner et al., 1987; Turner, 1991). Due to individuals favoring one's ingroup over the outgroup (Tajfel et al., 1971), attitudes and behaviors are influenced by intergroup biases (Turner et al., 1987), meaning minorities that are part of the outgroup are unlikely to have influence on others, or even demotivate them to change, thus moving away from the outgroup. While this process applies to moralized minorities such as vegans, it can be applied to minorities in general, including climate change deniers. If the majority believes that the climate crisis is real, those denying its existence and therefore deviating from the norm are likely to be seen as the outgroup, also if not threatening the moral self-concept. Again, they are less likely to have influence on the majority due to not being part of their ingroup. Thus, when vegans and deniers are perceived as deviant, they are less likely to be accepted by others, compared to more normative group members.

### **Minority Influence**

#### ***Minorities Changing Private Opinions***

But does that mean that social norms do not change at all due to minorities? Moscovici (1976) first challenged the view that majority influence is dominant by arguing that minorities are also a source of change. While majority influence is often driven by public conformity due to social or informational dependence, minority influence leads to private changes in beliefs rather than public ones (Moscovici, 1980). As groups are not completely homogeneous, there is potential for divisions and cognitive conflict which are made explicit by deviants who act in consistency, through which new norms are able to emerge (Moscovici, 1980). A review on the topic of minority influence on climate change mitigation points out that pro-environmental minorities do encounter social sanctioning, yet recent literature underscores encouraging findings on how these minorities can drive societal change (Bolderdijk & Jans, 2021). While minorities can have influence, it is generally more subtle and indirect, by first changing majority opinions in private, which could later affect majority behavior (Bolderdijk & Jans, 2021). Applying this to veganism, it means that the

vegan deviant may influence the majority to change their opinion partly and consider themselves flexitarian, which has the potential to later translate to behavioral change (Bolderdijk & Jans, 2021). In case of a climate change denier being the deviant, they might initially prompt someone in the majority to privately question the consensus on climate change. Over time, this private doubt could manifest as more public expressions of skepticism. Overall, prior research suggests that minority influence tends to occur indirectly, manifesting in private opinion changes (Bolderdijk & Jans, 2021; Moscovici, 1980). Yet the wider social context in which the interactions with minorities take place has to be considered, as well as broader values of similarity or diversity.

### ***Social Context Determining how the Minority is Seen***

As self-categorization theory suggests, the prominence of a social identity depends on both individual characteristics and the context (Turner et al., 1987). Building on this, the concept of meta-contrast is introduced where an existing identity becomes more salient when differences between groups are greater than differences within the group (Turner et al., 1987). This means that the smaller the perceived differences between people and the larger the differences to others the greater the likelihood of them being grouped together and forming new identities (Turner et al., 1987). This implies that whether a vegan is perceived as part of the ingroup or the outgroup depends on the wider social context. Moreover, social norms driven by a minority are more likely to change when the deviant is seen as a prototypical group member, meaning the person best representing the group's defining attributes and distinguishing it from outgroups, which depends on the social context (Brown & Pehrson, 2019). Furthermore, the term 'social attraction' defines the phenomenon of group members aligning their behaviors with that of the perceived prototype of their ingroup (Hogg & Hardie, 1992). Other researchers have described similar concepts, such as the prototype being a frontrunner or identity entrepreneur (Bolderdijk & Jans, 2021; Steffens et al., 2013). In a group with environmental concerns, a vegan could be seen as progressive and become a prototypical group member, therefore being more likely to influence other non-vegans. This is especially likely when a climate change denier is present, too, as the presence of the clear outgroup

amplifies the distinction between groups of people believing in climate change and those who do not. Without the denier's presence, both the vegan and non-vegan groups believe climate change is real, but in this case, the vegan would be seen as more extreme and thus being deviant from the ingroup and seen as the outgroup. In the context of the German population having rather pro-environmental views (Umweltbundesamt, 2023), the vegan minority is more likely perceived as part of the ingroup and seen as prototypical, especially with the opposing minority present, thereby having more influence on the other group members who share the belief that climate change is real.

Furthermore, while majority influence can be described as a heuristic process where people follow the majority without much questioning (Martin & Hewstone, 2003), minority influence happens deliberately and through a thoughtful process where the individual first changes their opinion but does not show it to the outside yet (Bolderdijk & Jans, 2021). In the context of having a vegan minority present, this deliberate process was found to extend to the social realm and change social norms after having an active discussion and listening to one another (Koudenburg & Jans, 2023). On the other hand, minority influence can follow a more heuristic route through self-categorization into ingroups and outgroups (Turner et al., 1987). By not solely having the vegan minority present but adding the climate change denier, the group will be seen as more polarized, making people feel the need to choose who to side with. In this context, the vegan would not need deliberation to have influence, if the person choosing sides does believe in the existence of climate change. Thus, the denier might actually enhance pro-environmental views rather than hinder progress. Here, our starting assumption is that the denier is perceived as more deviant compared to the vegan minority. Moreover, the first hypothesis states that the vegan minority is more influential in a situation where an opposing minority (in the form of a climate change denier) is present.

### ***Value in Diversity***

Another factor to consider that influences the acceptance of deviant perspectives is how individuals value diversity in interactions (Hornsey et al., 2006). Research has shown that whether the response to deviant perspectives is positive or negative may vary based on whether groups



prioritize similarity or diversity (Hornsey et al., 2006; Levine, 1989). While some groups thrive on uniformity, others value diversity and a plurality of opinions, which defines their group identity (Hutchison et al., 2011). In these groups, those deviating from the majority views are less likely to be rejected because group members expect and value diverse opinions and disagreement (Hornsey et al., 2006; Hutchison et al., 2011; Jans et al., 2019). A recent study by Koudenburg and Jans (2023) in the context of vegan deviants found that valuing diversity predicts the perception that adopting a vegan diet challenges the identity of the group, meaning identity is not defined by commonalities but rather by unique insights. When groups value diversity, they are likely more open to engaging with, listening to, and thus accepting deviants in their group (Koudenburg & Jans, 2023). Generally, when being part of the ingroup, minority influence is more likely to occur, yet there is less need to conform if the group values diversity (Koudenburg & Jans, 2023). On the other hand, for groups highly valuing similarity, deviants can threaten the shared group identity, which is likely to lead to their rejection and thus not being influential (Hornsey et al., 2006; Turner et al., 1987). Yet, recent research found that groups with high value in similarity did not reject deviants but rather quickly shifted the group norm towards the vegan deviants' views, possibly because they were perceived as prototypical (Koudenburg, unpublished). Furthermore, it can be argued that the findings of value in diversity strengthening the vegans' minority influence could be not due to the value itself, but rather people scoring high for value in diversity already being more left-leaning and environmentally friendly. Moreover, values in diversity and environmental values are self-transcending values, as they emphasize collective well-being and the importance of a diverse and inclusive society. It has been found that those endorsing self-transcending values exhibited greater ecocentrism, stronger personal moral norms, and a higher intention to engage in behaviors that protect the environment (Cheung et al., 2014).

This research aims to shed light on the conflicting findings through changing the social context by bringing a second deviant with opposing views into the discussion. Finally, it is

hypothesized that value in diversity will foster minority influence less when both the vegan and climate change denier are present.

### **The Present Research**

This study extends previous research by not only investigating the effect of the vegan as a deviant, but also including a climate change denier, and analyzing the effects of their interaction. By doing so we change the dynamic in the group, allowing us to observe potential effects of minority influence in a polarized context. The three conditions possibly instigating change are: (1) only a vegan as minority present in the interaction, (2) only a climate change denier as minority present, and (3) both opposing minorities present. The three conditions were introduced in scripts of online conversations where the presence of the minority was manipulated.

### ***Hypotheses***

H1. We assume the vegan minority to be more influential in a situation where an opposing minority (in the form of a climate change denier) is present.

H2. We hypothesize that value in diversity will foster minority influence less when both opposing minorities are present.

As the whole process of whether minorities can spark social change and to what extent is influenced by the group dynamic and the value placed on diversity (Hornsey et al., 2006; Levine, 1989; Koudenburg & Jans, 2023), value in diversity was assessed as a potential moderator. Moreover, we assessed values as an exploratory measure before the manipulation as biospheric values might explain whether the influence is due to pre-existing environmental values. To test whether the minorities were perceived as deviant and understand their role in the group, deviance and acceptance were assessed, as well as identification with the group. Afterward, the dependent variables that we assessed included attitudes and intentions towards sustainable behavior and veganism, and vegan policy support. In doing so, the study aims to explore how the presence of vegans and climate change deniers influences people's attitudes and intentions toward sustainable behaviors.

## Methods

### Sample and Design

The majority of the participants were gathered through snowballing on social media and in personal networks. Next to this, some participants were recruited via SONA, a platform from the University of Groningen for studies in the field of psychology. They were compensated with 0.4 SONA credits. Other participants did not receive incentives. While 193 people started participating in the study, the attrition was 65 in total. These participants were excluded due to only having answered questions assessing the pre-measures but not the relevant questions about the outcome variables, thus not yet being assigned to a randomized condition. In addition to this, those who follow a vegan diet ( $n = 10$ ) or deny the existence of climate change ( $n = 1$ ) were excluded, as they are part of the minorities whose influence is being measured. Furthermore, 6 more participants were excluded based on having completed the questionnaire in under 5 minutes, indicating they did not thoroughly read all questions and the manipulation text, and whose answers indicated that they did not pay attention. Given the length and complexity of the survey, it is not feasible to thoroughly read the manipulation text and respond to the questions in such a short time. Thus, the participants likely did not pay sufficient attention, potentially skewing the results which poses a risk for the reliability and validity of the study. The average time it took participants to finish the study, after excluding three outliers who took much longer, was 21 minutes. After exclusion, the participants of this study ( $N = 111$ ) consisted of 79 women, 28 men, two non-binary persons, and two unknown, all over the age of 18, with a mean age of  $M = 26.1$ . The nationality of the majority of participants was (at least partially) German or living in Germany ( $n = 92$ ), as the study was conducted in German. Other nationalities include Austrian and Dutch. Participants were randomly assigned to one of three conditions of a between-subjects design: vegan ( $n = 44$ ), climate change denier ( $n = 38$ ), or both ( $n = 29$ ). An a priori power analysis was conducted using G\*Power 3.1. The analysis was based on an F-test for ANOVA with fixed effects, specifying a medium effect size ( $f^2 = .25$ ), an  $\alpha$  error probability of .05, a power of .80, three groups for the independent variable, and a numerator

degrees of freedom of 2. Based on this, the required sample size is 158 participants. However, due to the high rate of attrition, our sample size is lower than intended, which may impact the statistical power of our findings, potentially increasing the risk of Type II errors. To address this, we performed post-hoc power analyses to estimate the actual power achieved with the obtained sample size and to interpret the results within this context. Based on the final sample size and observed effect size it revealed an achieved power of .64, indicating the probability that the study correctly detected a true effect, meaning the study may be underpowered to detect smaller effects.

### **Procedure and Experimental Conditions**

The study took place online. Prior to participating in the study, all participants provided informed consent. They were informed that their participation in the research project was voluntary and that their responses were handled with confidentiality. Values were assessed before as an exploratory variable, together with conformity. Value in diversity was measured as a potential moderator, together with value in similarity. Additionally, a manipulation check was assessed to ensure that the manipulation had the effect as intended, measuring polarization, deviance, and acceptance. Here, the dependent variable measuring identification with the people from the online forum was assessed, too. The outcome variables measured in the study are attitudes and intentions towards veganism and sustainable behavior, and vegan policy support. In the end, to not influence previous responses, participants were asked what diet they follow (*omnivore, flexitarian, pescatarian, vegetarian, vegan*) and whether they believe in (human-made) climate change (*yes or no*). Finally, demographic information (age, gender, and nationality) was assessed. After having completed the questionnaire, participants were debriefed about the study's aim of investigating the influence of minorities, specifically focusing on veganism and environmental views. It was specified that participants were randomly assigned to one of three conditions involving either a vegan, a climate change denier, or both. It was also mentioned that the specific focus on minority influence was not disclosed during the study to avoid bias and ensure valid results. Descriptive statistics for the dependent variables and correlations between the measures can be seen in Table 1.

**Table 1***Descriptive Statistics and Correlations for the Dependent Variables*

	N	Mean	SD	1	2	3	4	5	6	reliability
1. Sustainable attitude	111	5.53	0.66							.87
2. Vegan attitude	109	4.63	1.30	.60**						.87
3. Vegan intention	109	4.43	0.92	.46**	.82**					.80
4. Sustainable intention	109	4.54	0.44	.51**	.20*	.39**				.54
5. Identification	111	4.66	1.12	.13	.26**	.28**	-.01			-
6. Vegan policy support	109	4.98	1.48	.62**	.69**	.61**	.24*	.22*		.73
7. Polarization	111	4.39	0.88	.12	.03	-.06	.24*	-.25**	.08	.84

\* $p < .05$ . \*\* $p < .01$ .

***Manipulation***

For the manipulation, participants read an online chat in a forum on public participation under the prompt of what can be done in Germany to be more sustainable. Here participants were randomly assigned to one of three conditions, where their chat included comments by either a vegan, a climate change denier, or both. The other statements in the chat were the same for each condition. The first comment was about thinking that the system needs to change before people can, giving the example of wanting to use public transport more but criticizing the bus only driving once every hour. Afterward, the online chats differ according to their condition. In the condition with only the vegan, the second comment was the vegan statement about individuals having control over their food consumption and that everyone should go vegan to be more sustainable. This was followed by two statements about how much more emissions are eluded by big companies and other countries polluting the environment more than Germany. Lastly, the vegan commented again saying they agree that the system needs to change, but that individuals are responsible for making changes themselves, too, ending with the following sentences: “Every decision we make leads to destroying the planet more or protecting it. And by going vegan we help the planet”. Secondly, the condition with the denier being the only minority present is structured the same way as the first, only exchanging the comment by the vegan with that of the climate change denier. It entails not buying

into the hype of climate change but it being part of a natural cycle and thus not seeing any need to change one's behavior. After the other majority statements the denier's second comment states: "I agree that this is not our responsibility, but I think this is not even a problem to begin with. The German government should focus on real issues, and not jump on the panic train that is climate change. We should not change our lifestyle just because some folks think the world is ending. I'm not buying into the guilt trip". Lastly, in the condition with both minorities present, the vegan comment is made by the second user, and the denier's comment by the third. The statements are the same as in the conditions where they are individually present. After comments by the non-minority users, the last two comments are first the denier and then the vegan stating their opinion again, using the same formulation as in the other two conditions. The original chats in German that were used in the study can be found in the Appendix Figures 1, 2, and 3.

### **Measurements**

The majority of measures<sup>1</sup> in this study assessed the items on a 7-point Likert scale ranging from 1 = *completely disagree* to 7 = *completely agree*. The reliability of the measures was assessed using Cronbach's alpha. For measures with only two items, the Spearman-Brown coefficient was used. A threshold of 0.7 indicates acceptable reliability. The reliability of dependent variables is displayed in Table 1.

### ***Pre-measures***

#### ***Values & Conformity***

The first set of questions assessed the participants' altruistic, biospheric, and egoistic values, as well as their conformity values. The values were assessed based on the Environmental Schwartz Value Survey (E-SVS) consisting of 16 items (Steg et al., 2014). Conformity was measured within the same set of questions based on Schwarz's definition of conformity (Castaño & Lino, 2013).

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<sup>1</sup> We additionally assessed public behavioral intention by asking the following: "Imagine that as a 'thank you' for participating in the online discussion, you get a voucher for food delivery. What would you order?". The participants were asked to choose between a vegan meal, a vegetarian meal, a meal with meat, or one with fish. Moreover, right after reading the chat, participants were asked what they would respond if they were to comment next: "After reading the blog entry and the other people's responses, what would your comment say? (please write at least 2 sentences)". However, as these measures were not central for this thesis they were not assessed in this study.

Participants rated the importance of the values as guiding principles in their lives on a scale from -1 = “opposed to my values” to 7 = “of supreme importance”, of which four items measured biospheric values ( $\alpha = .85$ ).

### ***Value in Diversity***

For the second pre-measure, participants were asked questions about how they value diversity in three items ( $\alpha = .69$ ), and two for values in similarity (*Spearman-Brown*  $r = .46$ ). The questions used to assess value in diversity include “In groups I value the other’s differences”, or “I think diversity in beliefs and opinions can strengthen a group”. One of the questions used to measure similarity was: “I value having things in common with others”.

### ***Measures***

#### ***Polarization Manipulation Check***

Next, manipulation checks were conducted assessing perceived polarization with people in the chats through a total of nine items asking about the participants’ opinions on whether the users commenting in the forum were seen as agreeing with each other or not, e.g.: “The people commenting shared similarities in beliefs and values”, “Most people on the forum think the same about the topic of climate change”.

#### ***Identification***

In the same set of questions, identification was assessed with an adapted version of the single-item social identification measure (SISI) by Postmes and colleagues (2012). The exact measure used was: “I identify with the other people in the forum”.

#### ***Deviance & Acceptance***

To measure deviance, the participants were asked separately for all users whether they deviated from the group and if they were accepted in the group “The opinion of User (1) deviates from the opinion of the rest of the group” (Jans et al., 2019; Koudenburg et al., 2015). To measure acceptance for each user from the chat, the question was followed up with: “User (1) is being accepted by the group”.

### *Sustainability Attitudes*

We used a shortened version of the (Revised) New Ecological Paradigm (NEP) scale to examine attitudes towards sustainability (Dunlap et al., 2000). To keep the questionnaire shorter, only the eight positive items were used, based on research findings stating that the shortened version of the questionnaire performed as well as when using the full set of questions ( $\alpha = .78$ , Zhu and Lu, 2017). Additionally, sustainable attitudes were measured based on four questions derived from the EU survey on environmentalism, asking questions such as “More should be done to protect the environment” ( $\alpha = .80$ , Directorate-General for Communication, 2020). Personal attitudes towards specific sustainable behaviors were assessed via five items asking about opinions towards recycling, using public transport, using reusable packaging, and saving energy, plus flying and using cars (reverse coded) ( $\alpha = .72$ ). Having high reliability when combined, the three scales were assessed together, see Table 1.

### *Personal Attitudes & Intentions*

Moreover, personal attitudes and intentions towards veganism and sustainable behavior were measured on the individual and group levels (Koudenburg, unpublished). Six items using the same behaviors as when assessing personal sustainable attitudes were used to measure intentions towards sustainable behaviors. We also assessed attitudes towards veganism as well as intentions to eat vegan via three items asking about eating meat and animal-based products (reverse coded), as well as eating vegan to assess personal attitudes.

### *Policy Support*

As the last outcome variable, vegan policy support was measured by assessing the following two questions: “I am in favor of government subsidies for vegan food production” and “I think that government policies should aim to reduce the consumption of animal-derived foods”.



**Table 2***Descriptive Statistics per Condition*

Condition	Vegan		Both		Denier		N
	(n = 44)		(n = 29)		(n = 38)		
	M	SD	M	SD	M	SD	
Sustainability attitude	5.52 <sup>a</sup>	0.68	5.55 <sup>a</sup>	0.62	5.53 <sup>a</sup>	0.71	109
Vegan attitude	4.60 <sup>a</sup>	1.31	4.69 <sup>a</sup>	1.13	4.62 <sup>a</sup>	1.44	109
Vegan intention	4.45 <sup>a</sup>	0.90	4.33 <sup>a</sup>	0.93	4.47 <sup>a</sup>	0.94	109
Sustainability intention	4.48 <sup>a</sup>	0.46	4.60 <sup>a</sup>	0.33	4.57 <sup>a</sup>	0.48	109
Identification	5.02 <sup>b</sup>	1.05	4.72 <sup>ab</sup>	1.07	4.16 <sup>a</sup>	1.26	111
Vegan policy support	4.95 <sup>a</sup>	1.58	4.90 <sup>a</sup>	1.19	5.07 <sup>a</sup>	1.59	109
Diversity	5.53 <sup>a</sup>	0.73	5.21 <sup>a</sup>	0.74	5.24 <sup>a</sup>	0.89	111
Similarity	5.75 <sup>a</sup>	0.75	6.12 <sup>a</sup>	0.82	5.74 <sup>a</sup>	0.88	111
Polarization	3.76 <sup>a</sup>	0.63	4.70 <sup>b</sup>	0.73	4.83 <sup>b</sup>	0.85	111

**Results****Assumptions**

We tested the assumptions of homogeneity and normality. While the assumption of homogeneity was met for each of the variables, the assumption of normality was only partly met. This could be due to the sample size only being 111 after exclusion, which led to group sizes of 29 to 44 participants per condition, making it less reliable. This potentially affects the precision of estimates and the accuracy of the results. Despite the violation of normality, we proceeded with the analysis, considering the robustness of the ANOVAs, in order to explore potential effects while accounting for the violation.

**Manipulation Check**

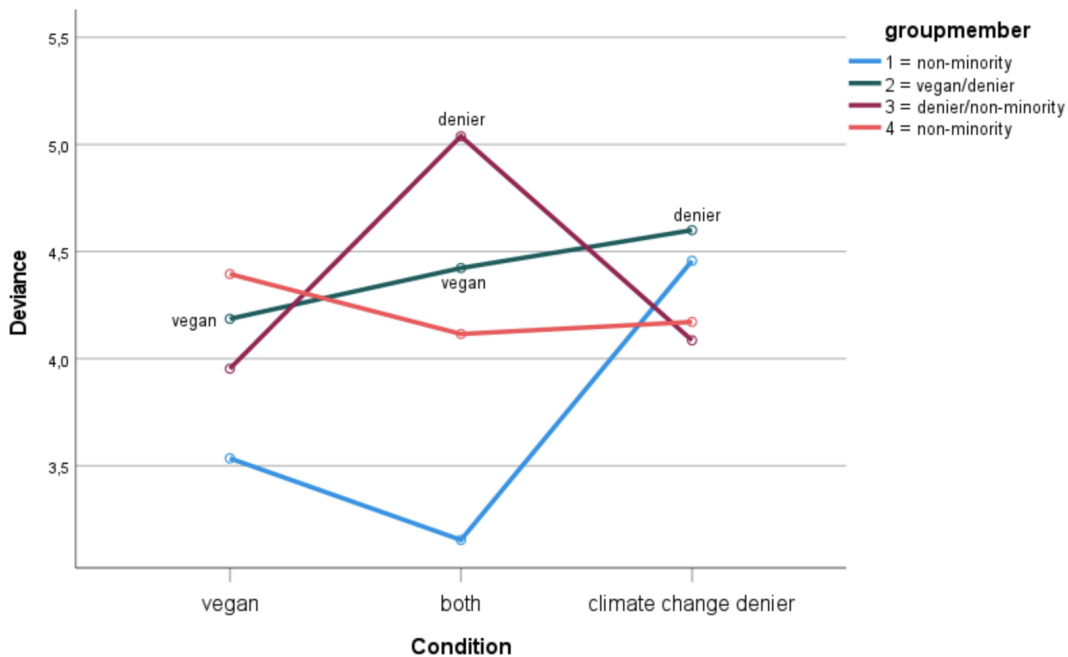
All analyses were conducted using IBM SPSS Statistics 28. First, we checked if the manipulation worked as intended by conducting a one-way ANOVA to compare the means of polarization across the three conditions. The results indicated a significant effect of the condition, so

which minority was present, on how polarized the group was perceived to be,  $F(2, 108) = 22.30, p < .001, \eta^2 = .29$ . Post hoc pairwise comparisons using Bonferroni correction revealed the direction of this effect. The chat having only the vegan minority present ( $M = 3.81, SD = 0.66$ ) was perceived as less polarizing compared to when both opposing minorities were present ( $M = 4.70, SD = 0.73, p < .001$ ), as well as when only the climate change denier was there ( $M = 4.83, SD = 0.85, p < .001$ ). The conditions with only the denier and with both minorities were perceived as equally polarized,  $p = 1.00$ . As the conditions including the denier were perceived as more polarized compared to the condition only having the vegan minority present, the manipulation for the group including both minorities worked as intended.

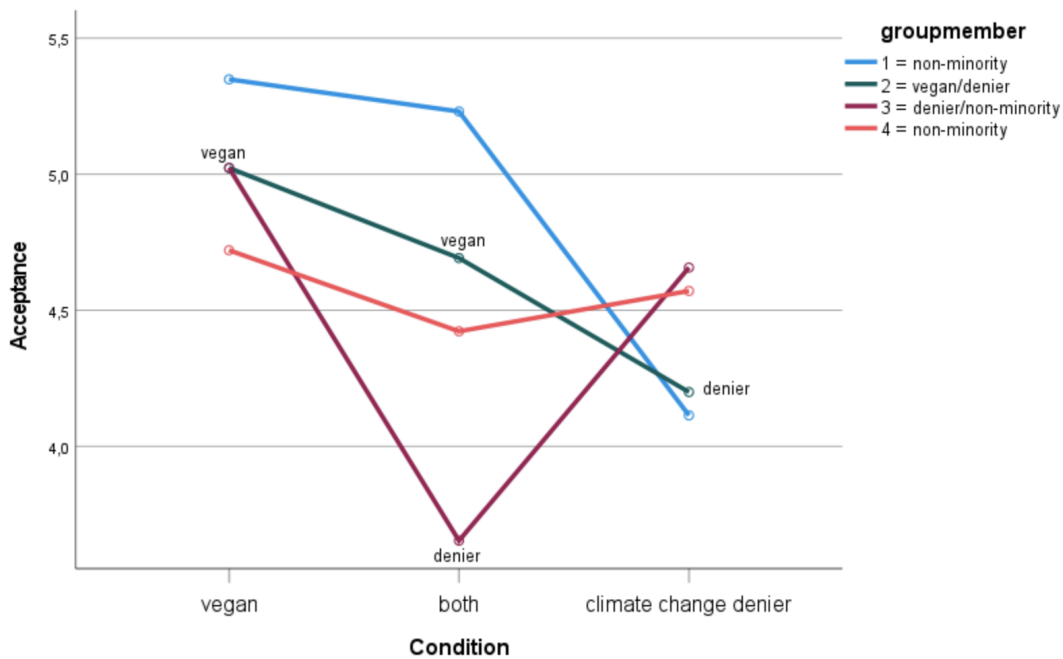
Going beyond how polarized the groups were perceived to be, identification with the groups was analyzed using a one-way ANOVA, as it relates to the perception of the deviants. We found a statistically significant difference in identification with the group depending on the condition participants were assigned to,  $F(2, 108) = 6.411, p = .002$ . A Bonferroni post-hoc test revealed that identification was significantly higher in the condition with only the vegan ( $M = 5.05, SD = 1.03$ ) compared to only the denier ( $M = 4.16, SD = 1.26, p = .002$ ). Identification with the group including both minorities did not differ significantly ( $M = 4.62, SD = 1.07$ ). Thus, participants identified most with the group where no denier but only a vegan was present.

Moreover, repeated measures analyses using the general linear model were conducted to assess if the deviants were actually perceived as deviating from the group, see Figure 1. To measure deviance and acceptance we included the four users in the chat (ignoring user 5 in the opposing minorities condition) as within subject factor, and condition as between subject factor. User 1 and 4 represent the non-minority members that were rather normative in all three conditions, as well as User 3 in the first and third condition. User 2 always represents a deviant in the group, so the vegan in the first and denier in the third condition. In the second condition, as both deviants are present, User 2 represents the vegan while User 3 represents the denier. The results of the repeated measures ANOVA indicate no significant main effect of the group member on deviance,  $F(2, 101) = 1.11, p =$

.33,  $\eta^2 = .02$ . Still, to see if there might be specific pairs of conditions and group members that differ significantly from each other, pairwise comparisons using Bonferroni were assessed. In the condition where both minorities were present, the denier was perceived to be more deviant than those not being a minority, specifically User 1 ( $M_{\text{difference}} = 1.89$ ,  $SE = 0.31$ ,  $p < .001$ ) and User 4 ( $M_{\text{difference}} = 0.92$ ,  $SE = 0.33$ ,  $p = .036$ ). However, the difference was not significant when comparing to the vegan ( $M_{\text{difference}} = 0.62$ ,  $SE = 0.36$ ,  $p = .52$ ). Based on this, the starting assumption of the denier being perceived to be more deviant compared to the vegan does not hold true, as the difference is not significant. In the condition with the vegan being the only minority present, the vegan was not perceived as significantly more or less deviating from the group compared to the other non-minority group members, namely User 1 ( $M_{\text{difference}} = 0.65$ ,  $SE = 0.28$ ,  $p = .12$ ), User 3 ( $M_{\text{difference}} = 0.23$ ,  $SE = 0.28$ ,  $p = 1.00$ ) and User 4 ( $M_{\text{difference}} = -0.21$ ,  $SE = 0.28$ ,  $p = 1.00$ ). In the condition where the climate change denier was the only minority present, no significant differences were found between the perceived deviance of the other non-minority group members either, specifically for User 1 ( $M_{\text{difference}} = 0.14$ ,  $SE = 0.31$ ,  $p = 1.00$ ), User 3 ( $M_{\text{difference}} = 0.43$ ,  $SE = 0.31$ ,  $p = 1.00$ ), and User 4 ( $M_{\text{difference}} = 0.51$ ,  $SE = 0.31$ ,  $p = .57$ ). Thus, the vegan was not seen as a deviant in either group they were in, and the denier was solely perceived to be deviant in the group with both minorities present.

**Figure 1***Differences in Perception of Deviance of Users in the Chat*

Next, acceptance of the minorities was assessed the same way to see if the vegan or climate change denier were accepted more or less in the group. The test of between-subjects effects revealed a significant main effect of condition on acceptance,  $F(2, 101) = 7.37, p = .001, \eta^2 = .13$ , indicating that participants' levels of acceptance significantly differed depending on the condition they were assigned to. Pairwise comparisons between the group members and conditions revealed that the acceptance for both the vegan and denier was rated similarly to the other non-minority group members when they were the only minority present. However, in the condition with both minorities present the denier was accepted less than the vegan ( $M_{\text{difference}} = -1.04, SE = 0.27, p = .001$ ), and than the non-minority group members, namely User 1 ( $M_{\text{difference}} = -1.58, SE = 0.25, p < .001$ ), and User 4 ( $M_{\text{difference}} = -0.77, SE = 0.28, p = .038$ ). Here, the vegan was accepted similarly to the non-minority users, specifically User 1 ( $M_{\text{difference}} = -0.54, SE = 0.28, p = .35$ ) and User 4 ( $M_{\text{difference}} = 0.27, SE = 0.27, p = 1.00$ ). Thus, while the vegan received similar acceptance to the other non-minority members both in their individual group and when the denier was present, the denier was only accepted similarly in their own condition. However, the presence of both minorities together resulted in significantly lower acceptance for the denier.

**Figure 2***Differences in Perception of Acceptance of Users in the Chat*

Based on this manipulation and assumption check it can be said that the manipulation for the vegan did not work as intended, as they were not perceived as deviating from the group. While both conditions including the climate change denier were seen as polarized, the denier was only seen as deviating from the other non-minority group members in the condition with both minorities present. In this condition, the denier was accepted less as well. Moreover, when the denier was the only minority present, identification with the group was lower. Thus, the manipulation of including the denier in the second condition generally had the expected effect, except for not being perceived as more deviant than the vegan.

### **Main Effects: Moderation Analysis**

To investigate whether there is an effect of the condition (vegan, denier, or both) on attitudes and intentions towards sustainability and veganism, and vegan policy support and whether it is moderated by participants' value in diversity, moderation analyses were conducted using PROCESS in SPSS, see Table 3. The descriptive statistics including standard deviations and differences in means between conditions are indicated in Table 2.

***Hypothesis 1: Minority Influence on Sustainable & Vegan Attitudes, Intentions & Policy Support***

The results of the analysis show that there were no significant main effects of the conditions on neither sustainable and vegan attitude, sustainable and vegan intention, nor vegan policy support, see Table 3. Thus, the first hypothesis assuming that the vegan minority is more influential in a situation where an opposing minority (climate change denier) is present was not supported.

**Table 3**

*Main effects and Interaction Moderation Analysis Value in Diversity*

	Sustainable attitude		Vegan attitude		Sustainable intention		Vegan intention		Vegan policy support	
	B (SE)	p	B (SE)	p	B (SE)	p	B (SE)	p	B (SE)	p
Vegan vs both (C1)	.04 (.17)	.79	.08 (.33)	.82	.13 (.11)	.23	-.16 (.23)	.50	-.12 (.37)	.75
Vegan vs denier (C2)	.02 (.15)	.89	.06 (.30)	.85	.11 (.10)	.28	.03 (.21)	.89	.09 (.34)	.80
Diversity	-.04 (.14)	.76	.03 (.29)	.92	-.01(.10)	.96	-.003 (.20)	.99	-.38 (.34)	.24
Diversity x C1	.17 (.22)	.46	-.23 (.45)	.61	.08 (.15)	.59	-.28 (.31)	.37	.40 (.50)	.43
Diversity x C2	.18 (.19)	.33	.24 (.38)	.52	.14 (.13)	.28	.08 (.27)	.75	.78 (.43)	.07
R square	.02		.02		.04		.02		.04	
X*W sign.	.86		.89		.46		.84		.59	

Note. \*p < .05. \*\*p < .01.

***Hypothesis 2: Effect of Value in Diversity***

Furthermore, the moderation analyses using PROCESS did not reveal any effect of value in diversity nor an interaction between the independent variable of the condition the participants were assigned to and the moderator of value in diversity in predicting the dependent variables, see Table 3. Thus, the results do not support the second hypothesis stating that value in diversity will foster minority influence less when both opposing minorities are present.

**Exploratory Results**

As there were no main effects found from the condition on the outcome variables and neither for value in diversity as a moderator variable, exploratory analyses were conducted to explore potential relationships that the moderation analyses may not have captured.

*Moderation Analysis: Controlling for Value in Similarity*

Value in similarity was included as a covariate in the moderation analyses to control for its effects and allow for a more precise estimation of the effects of value in diversity and the condition. This is done as prior research found that value in similarity affects the acceptance and change towards vegan norms (Koudenburg, unpublished). The results indicate that the relationship between the covariate value in similarity and the outcome variables was significant for the dependent variables sustainable attitude, vegan attitude, vegan intention, and vegan policy support (see Table 4). In other words, higher value in similarity is associated with more pro-vegan intentions and attitudes, as well as greater support for sustainable attitudes and vegan policies. The interaction effect between the condition and value in diversity remains non-significant when controlling for value in similarity (see Table 4). This means that the condition's impact on the dependent variables is not moderated by value in diversity when accounting for value in similarity.

**Table 4**

*Main effects and Interaction Moderation Analysis Value in Diversity, Covariate Value in Similarity*

	Sustainable attitude		Vegan attitude		Sustainable intention		Vegan intention		Vegan policy support	
	B (SE)	p	B (SE)	p	B (SE)	p	B (SE)	p	B (SE)	p
Vegan vs both (C1)	-.09 (.15)	.54	-.13 (.31)	.67	.10 (.11)	.23	-.26 (.23)	.27	-.33 (.36)	.36
Vegan vs denier (C2)	.01 (.14)	.96	.04 (.28)	.89	.11 (.10)	.28	.02 (.21)	.93	.07 (.32)	.84
Diversity	-.05 (.13)	.71	.01 (.27)	.96	-.01 (.10)	.96	-.01 (.20)	.96	-.40 (.31)	.20
Diversity x C1	.18 (.20)	.36	-.19 (.42)	.65	.09 (.15)	.59	-.27 (.31)	.39	.44 (.38)	.36
Diversity x C2	.01 (.17)	.95	-.001 (.36)	1.00	.10 (.13)	.28	-.03 (.26)	.90	.53 (.41)	.20
Similarity	.38 (.08)	<.001**	.56 (.15)	<.001**	.08 (.05)	.14	.27 (.11)	.02*	.57 (.18)	.002**
R square	.21		.13		.06		.07		.13	
X*W sign.	.61		.87		.71		.65		.41	

Note. \*p < .05. \*\*p < .01.

***Moderation Analysis: Value in Similarity as Moderator, controlling for value in diversity***

As the previous exploratory analysis indicates that some effects are driven by value in similarity, moderation analyses were conducted having value in similarity as a moderator and controlling for value in diversity as a covariate. The results, shown in Table 5, indicate that value in similarity has a significant main effect on sustainable and vegan attitudes, as well as support for vegan policies. Specifically, this means that, while controlling for value in diversity, individuals who value similarity more tend to have higher levels of these three outcome variables compared to those who value similarity less. A lack of significant interaction effects (see Table 5) suggests that the relationship between the condition (vegan, denier, both) and the outcome variables does not significantly vary depending on participants' value in similarity. Thus, while value in similarity independently influences three of the outcomes, it does not change how the condition affects these variables.

**Table 5**

*Main effects and Interaction Moderation Analysis Value in Diversity, Covariate Value in Similarity*

	Sustainable attitude		Vegan attitude		Sustainable intention		Vegan intention		Vegan policy support	
	B (SE)	p	B (SE)	p	B (SE)	p	B (SE)	p	B (SE)	p
Vegan vs both (C1)	-.10 (.15)	.50	-.03 (.31)	.93	.09 (.11)	.43	-.20 (.23)	.38	-.16 (.35)	.66
Vegan vs denier (C2)	.02 (.14)	.89	.04 (.28)	.87	.10 (.10)	.31	.02 (.21)	.94	.12 (.32)	.71
Similarity	.37 (.12)	.004**	.55 (.25)	.03*	.16 (.09)	.07	.24 (.18)	.21	.67 (.28)	.02*
Similarity x C1	.01 (.19)	.94	-.41 (.38)	.28	-.01 (.13)	.95	-.16 (.28)	.57	-.79 (.43)	.11
Similarity x C2	-.01 (.17)	.98	.35 (.35)	.32	-.19 (.12)	.11	.24 (.26)	.35	.34 (.39)	.39
Diversity	.003 (.08)	.97	-.11 (.16)	.51	.08 (.06)	.15	-.13 (.12)	.27	-.16 (.18)	.40
R square	.20		.16		.09		.09		.16	
X*W sign.	1		.13		.21		.33		.054	

Note. \*p < .05. \*\*p < .01.



***Moderation Analysis: Biospheric Values***

Further, to see whether already having pre-existing environmental values might influence the relationship between the condition and outcome variables, a series of moderation analyses were performed with biospheric values as the moderator. This context was taken into account as it can be argued that those scoring high on these pre-existing pro-environmental values are more likely to support sustainable practices. While no significant interaction effects were found, biospheric values do lead to higher scores for all outcome variables except for sustainable intentions, see Table 6. While biospheric values do not explain the relationship between the condition and outcome variables, having higher biospheric values is associated with a more positive attitude toward veganism and sustainability, being in support for vegan policies and having more vegan intentions.

**Table 6***Main effects and Interaction Moderation Analysis: Biospheric Values*

	Sustainable attitude		Vegan attitude		Sustainable intention		Vegan intention		Vegan policy support	
	B (SE)	p	B (SE)	p	B (SE)	p	B (SE)	p	B (SE)	p
Vegan vs both (C1)	.04 (.12)	.73	.09 (.26)	.74	-.20 (.23)	.25	-.12 (.20)	.53	-.06 (.31)	.84
Vegan vs denier (C2)	.03 (.11)	.82	.02 (.24)	.92	.02 (.21)	.31	.02 (.18)	.91	.11 (.29)	.71
Biospheric	.34 (.06)	<.001**	.57 (.13)	<.001**	.02 (.21)	.20	.28 (.10)	.004**	.59 (.15)	<.001**
Biospheric x C1	-.03 (.10)	.77	-.18 (.21)	.39	-.16 (.28)	.50	.10 (.16)	.53	-.24 (.25)	.34
Biospheric x C2	-.02 (.08)	.77	.07 (.18)	.71	.24 (.26)	.98	.08 (.13)	.54	.05 (.21)	.81
R square	.43		.34		.09		.26		.27	
X*W sign.	.94		.48		.33		.77		.48	

Note. \*p < .05. \*\*p < .01.

**Discussion**

The purpose of this study was to gain a better understanding of the conflicting findings of when minority influence occurs, and what role value in diversity plays, taking the social context into account. This study extends previous research by not solely investigating the effects of a vegan minority, but adding an opposing minority in the form of climate change denier. In this study, we

examined how the presence of environmental minorities (a vegan and climate change denier) influences people's attitudes and intentions towards sustainable behaviors, including veganism, as well as vegan policy support. We assumed that the denier would be perceived as more deviant compared to the vegan minority and hypothesized that the influence of the vegan minority would be greater when both opposing minorities are present. Furthermore, we hypothesized that value in diversity would foster minority influence less when both opposing minorities were present.

The starting assumption of the climate change denier being perceived as more deviant was not directly supported by the results. While the denier was seen as more deviant than the non-minority group members, they were not seen as significantly more deviant than the vegan. Moreover, neither the denier, nor the vegan were perceived as deviants in the conditions where they were the only minority present. In the group with both minorities present, the denier was also accepted less.

Additionally, participants identified least with the group from the condition with only the denier minority being present. When combining the knowledge from these findings, it can be concluded that while the denier was not explicitly perceived as more deviant, their presence still negatively impacted acceptance and identification. The vegan, on the other hand, was not perceived as deviant, and was accepted similarly to the users who were not part of a minority. This contradicts prior research of vegans being derogated as they are a moralized minority (Minson & Monin, 2012).

The idea that the presence of an opposing minority in the form of a climate change denier leads to a more polarized context was supported by the results. This means that changing the social context by introducing an opposing minority does lead to an increase in the perception of polarization. However, not only the group including both minorities was perceived as polarized, but also the group where the denier was the only minority. Thus, the inclusion of the climate change denier to oppose the vegan was not what led to the group being seen as polarized, but solely the presence of the denier was sufficient to do so.

We assumed that the vegan minority is more influential in the presence of a climate change denier. This was based on self-categorization theory, where people categorize others and themselves into in- and outgroups, heightened through the group being perceived as polarized (Turner et al., 1987). Here, the likelihood of minority influence occurring increases when the minority is seen as part of the ingroup (Turner et al., 1987). Further, prototypicality of the minority influences whether they are seen as part of the ingroup or not. Due to the denier posing a clear outgroup for people believing climate change is real, it was argued that people are more likely to choose to side with the vegan, wherefore the influence would be larger in the condition with both vegan and denier present. As previously mentioned, the denier was perceived as more deviant than the non-minority group members in the condition where both minorities were present, but the vegan was not. Here, the group was also perceived as polarized. Moreover, only in this group the denier was accepted less compared to all other users in the group, including the vegan. This indicates that when both opposing minorities were present, the denier was perceived to be part of the outgroup, whereas the vegan was seen as being a member of the ingroup. Based on our previous argumentation, this should have led to the vegan having more influence when the denier was present, too. However, this was not the case, as the condition participants were assigned to did not influence the outcome variables. Further investigation is necessary in understanding the effects of the social context, specifically of having the different minorities present, on the occurrence of minority influence.

Furthermore, we investigated the role of value in diversity as a potential moderator. Research found that in groups valuing diversity, vegan influence was more likely to occur (Hornsey et al., 2006). This is due to those valuing diversity being more open to diverse opinions, while those valuing similarity are more likely to reject deviants to maintain group cohesion (Hornsey et al., 2006). However, while those valuing diversity are more accepting of people having different views, they do not feel pressure to conform to a homogeneous group again (Koudenburg & Jans, 2023). This is more likely to occur when there is not solely one person deviating from the group, but two with rather opposing views. Since value in diversity entails openness to other perspectives,

including those deviating from one's own views (Koudenburg & Jans, 2023), it is hypothesized that high value in diversity decreases the effect of vegan influence when both minorities are present. However, we did not find support for this, which does not align with findings from previous studies. Value in diversity was also manipulated in another longitudinal study, finding a gradual change in vegan and vegetarian viewpoints (Koudenburg, unpublished). A key difference between these studies and the current research is the methodology: the previous studies actively manipulated participants' value in diversity, while this study solely measured it. The differing outcomes could potentially be explained by this difference, meaning that manipulating value in diversity might have a more profound impact on participants' openness to minority influence, effectively priming them to be more receptive to diverse perspectives. In contrast, simply measuring pre-existing value in diversity might not capture the dynamic shifts in attitudes and intentions that can be facilitated through direct intervention. However, the longitudinal study found that minority influence happened gradually, and could not be seen immediately (Koudenburg, unpublished). Thus, a longitudinal design might shed light on whether value in diversity actually has no significant moderation effect, or whether it were to happen after some time. Furthermore, the longitudinal study found effects of value in similarity leading to a rapid change in group norms and behaviors towards the direction of the vegan. This fast change was said to occur due to conformity, which, while it was measured, was not analyzed in this research. Thus, future research could investigate how conformity processes interact with valuing similarity and diversity to better understand minority influence.

When controlling for the effects of value in similarity by including it as a covariate in the moderation analyses, we still found no effect of value in diversity. However, the results indicated that higher value in similarity is associated with more pro-vegan intentions and attitudes, as well as greater support for sustainable attitudes and vegan policies. When investigating the effect of value in similarity as a moderator while controlling for value in diversity, we again found no interaction effect, meaning valuing similarity does not change how the condition affects the outcome variables. Our findings go against the argument stating that prior research finding a positive relationship

between people scoring high on value in diversity and environmental attitudes could be due to the values being self-transcending. Instead, those who value similarity can also have strong pro-environmental and vegan attitudes, challenging the idea that only self-transcending values like valuing diversity lead to an increase in sustainable attitudes. Additionally, the findings are in accordance with the previous longitudinal research where groups valuing similarity shifted rapidly towards veganism and sustainable attitudes (Koudenburg, unpublished).

Another exploratory analysis was conducted to explore the effect of having pre-existing biospheric values on the outcome measures. The higher people's biospheric values, the more positive their attitude toward veganism and sustainability, support for vegan policies, and vegan intentions. This highlights the importance of intrinsic environmental values in shaping attitudes and intentions toward sustainable behaviors. Moreover, these already existing values might be stronger than reading someone else's opinion on the topic, potentially explaining why the conditions did not affect the outcome variables, but biospheric values do. Still, we argued that pre-existing attitudes, such as being pro-environmental, could affect minority influence by viewing the vegan as prototypical rather than deviant. While the vegan was indeed not seen as deviant, prototypicality was not assessed in this study. Also, the previous line of argumentation suggested that if that were to be the case, minority influence would occur, which goes against our findings. Directly measuring prototypicality could help further understand the complex interplay between the pre-existing values, minority influence, and sustainable behavioral change.

Moreover, this study only investigated attitudes and intentions, but not actual behavior. As the intention-behavior gap suggests, it is much easier to say one will behave a certain way, but it takes much more effort to actually follow through (Sheeran & Webb, 2016). As stated in the introduction, this was also found for sustainability, where awareness increases and attitudes are changing to be more pro-environmental, but this does not necessarily lead to change in actual behaviors (Venhaus et al., 2022). For this study, it could be argued that the majority was rather pro-environmental in general, so they already had sustainable beliefs but are not vegan themselves.

Thus investigating behavioral change could offer insights on actual minority influence. However, exploring behavior instead of intentions comes with many challenges, including feasibility and practical limitations such as having higher costs, time constraints, self-reporting biases, or ethical concerns.

### **Limitations & Future Research**

A limitation of our research is that the sample size is small, meaning it is slightly underpowered. This increases the risk of Type II errors, meaning that relevant differences or relationships might not be detected, thus seeing non-significant findings. Here, utilizing a larger sample size would enhance the generalizability and statistical power of findings, allowing for more robust conclusions about the impact of these values on sustainability and vegan attitudes and intention, as well as related outcomes. Furthermore, the effect of the manipulation might not have been strong enough to lead to significant differences in results. This could explain the climate change denier not being seen as more deviant than the vegan, as well as the minorities' perception as non-deviant when being the only minority present. Also, the manipulation not being strong enough could explain why the effect of the condition, and thus the minority, was non-existent and instead overshadowed by factors such as biospheric values. However, this could be solved by making the deviants more extreme in their arguments, or studying actual interactions instead of reading online-chats. Moreover, as previous research found different results of value in similarity and diversity over time, longitudinal research on this could shed more light on the implications of minority influence depending on the social context, also capturing long-term effects. Additionally, investigating conformity dynamics within groups that highly value similarity, which was measured but not analyzed in this research, could provide insights into the mechanisms underlying rapid norm shifts observed in response to minority influence. This would help our understanding of why the shift towards sustainability or veganism happens. Experimentally manipulating value in diversity and similarity to examine their causal effects could be beneficial, as it might increase the strength of the effect, leading to more meaningful results. As the study does not investigate behaviors but

instead focuses on attitudes and intentions, no real minority influence that has positive effects on the climate were measured. As mentioned in the beginning, attitudes are already shifting to be more pro-environmental, but behavior change is what is needed (Venghaus et al., 2022). Moreover, future research could benefit from investigating whether the minorities are seen as prototypical to gain better understanding of underlying processes when minorities are influential. Lastly, we recommend future studies to continue to explore the influence of the social context by including multiple deviants to test for polarizing effects, which was done by having one condition with both a vegan and a climate change denier present. This could broaden our understanding of when and how value in diversity and similarity facilitate or hinder group adaptation and decision-making processes, and if opposing deviants, which on first glance seem to lead to shifts in the opposite direction, might actually increase pro-environmentalism.

## **Conclusion**

While many people shift their opinion and attitudes to be more pro-environmental (Venghaus et al., 2022), more drastic changes are needed to combat the climate crisis (IPCC, 2023). Understanding the dynamics of how this change can be induced by those already living more sustainably is crucial. This study offers insights into the complex topic of minority influence, taking the social context of opposing environmental minorities into account. By not only investigating the influence of a vegan minority but also including a climate change denier, the group was perceived as more polarized which opens the possibility to investigate the influence of the social context more. The vegan and denier minorities were both not perceived to be deviant in the group where they were the only minority present. However, in the condition including both, solely the denier was seen as deviant, whereas the vegan was not perceived to be deviant here either. Contrary to previous findings, we did not find support for value in diversity impacting whether minority influence occurs or not. Instead, we found that those valuing similarity also had strong sustainable and vegan attitudes, challenging the idea that only self-transcending values like valuing diversity lead to increased sustainable attitudes. The findings potentially align with prior research where minority

influence was found to occur gradually when diversity is valued, and rapid if similarity is valued. Moreover, biospheric values play a significant role in shaping pro-environmental attitudes and intentions. While our findings contribute to the understanding of minority influence and the role value in diversity versus similarity plays, they also underscore the complexity of these processes and the need for further exploration of the impact of social context. Overall, this highlights the need to leverage diverse perspectives and values in driving effective action toward becoming more sustainable on a global scale.



### References

- AOK Gesundheitsmagazin (2023). Fleischkonsum und Umwelt: So wirkt sich Fleisch aufs Klima aus. *AOK - Die Gesundheitskasse*.  
<https://www.aok.de/pk/magazin/nachhaltigkeit/nachhaltige-ernaehrung/fleischkonsum-und-umwelt-so-wirkt-sich-fleisch-aufs-klima-aus/>
- Asch, S.E. (1956). Studies of independence and conformity: I. A minority of one against a unanimous majority. *Psychological Monographs*, 70(1), 1–70.
- BMEL (2023, 13. October). *Bundesminister Özdemir stellt Ernährungsreport 2023 vor*.  
<https://www.bmel.de/SharedDocs/Pressemitteilungen/DE/2023/124-ernaehrungsbericht.html>
- Bolderdijk, J. W., Brouwer, C., & Cornelissen, G. (2018). When Do Morally Motivated Innovators Elicit Inspiration Instead of Irritation? *Frontiers in Psychology*, 8(2362), Article 2362.  
<https://doi.org/10.3389/fpsyg.2017.02362>
- Bolderdijk, J. M., & Jans, L. (2021). Minority influence in climate change mitigation. *Current Opinion in Psychology*, 42, 25-30. <https://doi.org/10.1016/j.copsyc.2021.02.005>
- Brown, R., & Pehrson, S. (2019). Group processes: *Dynamics within and Between Groups* (Chapter 4, pp 85-100). John Wiley & Sons.
- Castaño, G., & Lino, L. (2013). Values (Shalom H. Schwartz) – conformity. In K. D. Keith (Ed.), *The Encyclopedia of Cross-Cultural Psychology* (pp. 1322–1323).  
<https://doi.org/10.1002/9781118339893.wbeccp595>
- Cheung, W. Y., Luke, M. A., & Maio, G. R. (2014). On attitudes towards humanity and climate change: The effects of humanity esteem and self-transcendence values on environmental concerns. *European Journal of Social Psychology*, 44(5), 496-506.  
<https://doi.org/10.1002/ejsp.2037>
- Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: compliance and conformity. *Annual review of psychology*, 55, 591–621. <https://doi.org/10.1146/annurev.psych.55.090902.142015>

Directorate-General for Communication. (2020, March 3). [Dataset]. Eurobarometer.

[http://data.europa.eu/euodp/en/data/dataset/S2257\\_92\\_4\\_501\\_ENG](http://data.europa.eu/euodp/en/data/dataset/S2257_92_4_501_ENG)

Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Emmet Jones, R. (2000). Measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues*, 56(3), 425–442. <https://doi-org.proxy-ub.rug.nl/10.1111/0022-4537.00176>

Engels, A., Hüther, O., Schäfer, M., & Held, H. (2013). Public climate-change skepticism, energy preferences and political participation. *Global Environmental Change*, 23(5), 1018–1027. <https://doi.org/10.1016/j.gloenvcha.2013.05.008>

European Commission. (2022). *The Politics of Protein: Examining claims about livestock, fish, 'alternative proteins' and sustainability | Knowledge for policy*. [https://knowledge4policy.ec.europa.eu/publication/politics-protein-examining-claims-about-livestock-fish-%E2%80%98alternative-proteins%E2%80%99\\_en](https://knowledge4policy.ec.europa.eu/publication/politics-protein-examining-claims-about-livestock-fish-%E2%80%98alternative-proteins%E2%80%99_en)

Hogg, M. A., & Hardie, E. A. (1992). Prototypicality, conformity and depersonalized attraction: A self-categorization analysis of group cohesiveness. *British Journal of Social Psychology*, 31(1), 41–56. <https://doi.org/10.1111/j.2044-8309.1992.tb00954.x>

Hornsey, M. J. (2006). Ingroup critics and their influence on groups. In T. Postmes & J. Jetten (Eds.), *Individuality and the group: Advances in social identity* (pp. 74–91). Sage Publications, Inc. <https://doi.org/10.4135/9781446211946.n5>

Hutchison, P., Jetten, J., and Gutierrez, R. (2011). Deviant but desirable: group variability and evaluation of atypical group members. *J. Exp. Soc. Psychol.* 47, 1155–1161. doi: 10.1016/j.jesp.2011.06.011

IPCC (2018). “Global Warming of 1.5 °C. An IPCC Special Report on the Impacts of Global Warming of 1.5 °C above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways.” in the context of strengthening the global response to the threat of climate change. doi:10.1017/CBO9781107415324.

- IPCC. (2023). *Climate Change 2023: Synthesis report* (Core Writing Team, H. Lee, & J. Romero, Eds.; pp. 35–115). <https://doi.org/10.59327/IPCC/AR6-9789291691647>
- Jans, L., Koudenburg, N., Dillmann, J., Wichgers, L., Postmes, T., & den Hartigh, R. J. (2019). Dynamic reactions to opinion deviance: The role of social identity formation. *Journal of Experimental Social Psychology*, 84, 103803. <https://doi.org/10.1016/j.jesp.2019.04.001>
- Koudenburg, N., & Jans, L. (2023). The group dynamics sparking social change: how group value in diversity predicts interactions with a deviant. *Frontiers in Social Psychology*, 1, Article 1240173. <https://doi.org/10.3389/frsps.2023.1240173>
- Koudenburg, N., Postmes, T., Gordijn, E. H., & van Mourik Broekman, A. (2015). Uniform and complementary social interaction: Distinct pathways to solidarity. *PloS one*, 10(6), e0129061. <https://doi.org/10.1371/journal.pone.0129061>
- Kurz, T., Prosser, A. M. B., Rabinovich, A., & O'Neill, S. (2020). Could vegans and lycra cyclists be bad for the planet? Theorizing the role of moralized minority practice identities in processes of societal-level change. *Journal of Social Issues*, 76(1), 86–100. <https://doi-org.proxy-ub.rug.nl/10.1111/josi.12366>
- Levine, J. M. (1989). Reaction to opinion deviance in small groups. *Psychology of group influence*, 2, 187-231.
- Martin, R., & Hewstone, M. (2003). Majority versus minority influence: When, not whether, source status instigates heuristic or systematic processing. *European Journal of Social Psychology*, 33(3), 313-330. <https://doi.org/10.1002/ejsp.146>
- Minson, J. A., & Monin, B. (2012). Do-Gooder Derogation: Disparaging Morally Motivated Minorities to Defuse Anticipated Reproach. *Social Psychological and Personality Science*, 3(2), 200-207. <https://doi.org/10.1177/1948550611415695>
- Moscovici, S. (1976). *Social influence and social change*. London: Academic Press.
- Moscovici, S. (1980). Toward a theory of conversion behavior. *Advances in experimental social psychology* (pp. 209–239). [https://doi.org/10.1016/s0065-2601\(08\)60133-1](https://doi.org/10.1016/s0065-2601(08)60133-1)

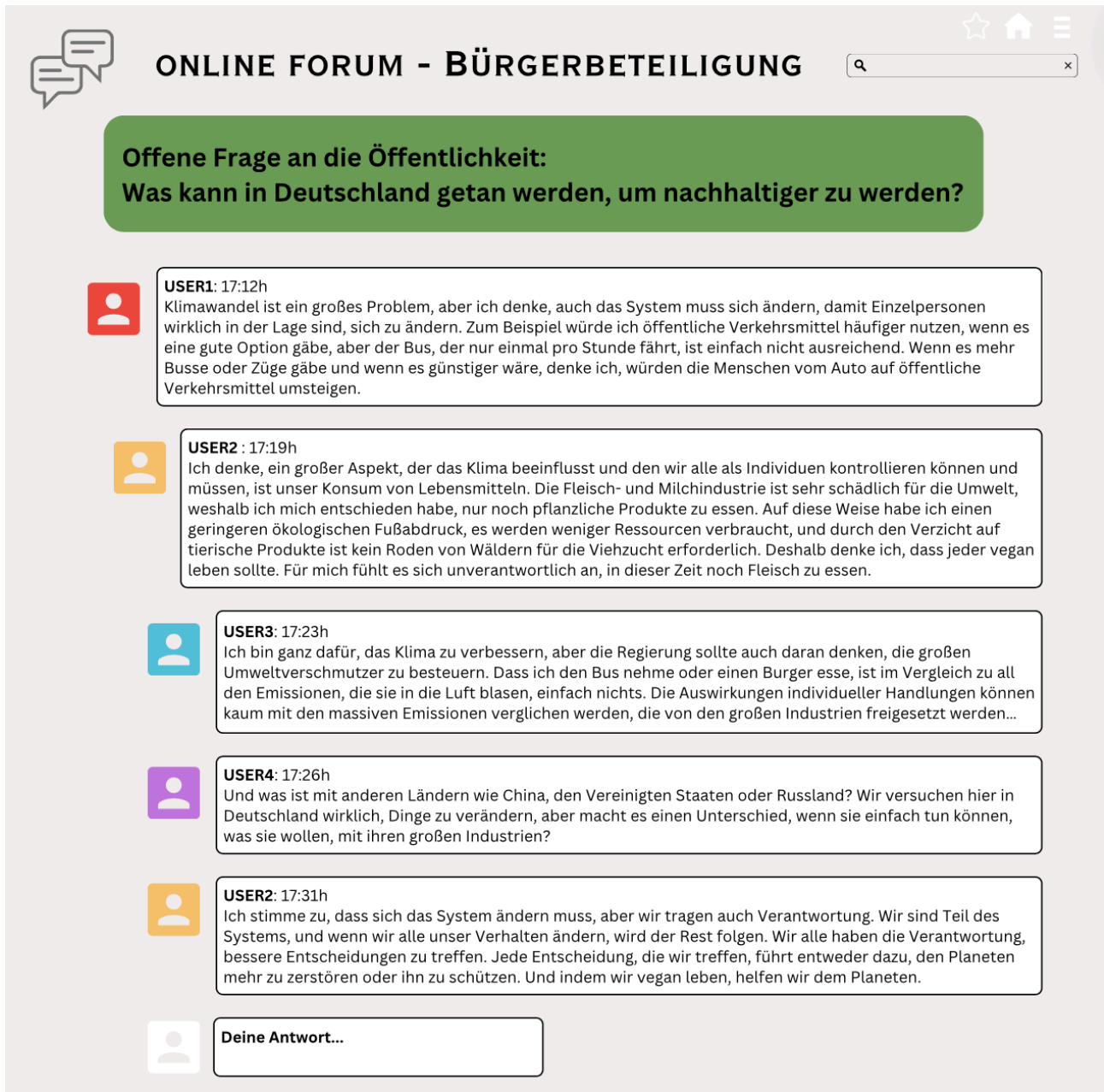
- Postmes, T., Haslam, S. A., & Jans, L. (2012). A single-item measure of social identification: Reliability, validity, and utility. *British Journal of Social Psychology*, 52(4), 597–617. <https://doi.org/10.1111/bjso.12006>
- Prislin, R. (2022). Minority influence: an agenda for study of social change. *Front. Psychol.* 13, 911654. doi: 10.3389/fpsyg.2022.911654
- Scarborough, P., Clark, M., Cobiac, L., Paper, K., Knuppel, A., Lynch, J., Harrington, R., Key, T. & Springmann, M. (2023). Vegans, vegetarians, fish-eaters and meat-eaters in the UK show discrepant environmental impacts. *Nature Food* 4, 565–574. <https://doi.org/10.1038/s43016-023-00795-w>
- Sheeran, P., & Webb, T. L. (2016). The intention–behavior gap. *Social and personality psychology compass*, 10(9), 503-518. <https://doi-org.proxy-ub.rug.nl/10.1111/spc3.12265>
- Steffens, N. K., Haslam, S. A., Ryan, M. K., & Kessler, T. (2013). Leader performance and prototypicality: Their inter-relationship and impact on leaders' identity entrepreneurship. *European journal of social psychology*, 43(7), 606-613. <https://doi.org/10.1002/ejsp.1985>
- Steg, L., Perlaviciute, G., Van der Werff, E., & Lurvink, J. (2014). The significance of hedonic values for environmentally relevant attitudes, preferences, and actions. *Environment and behavior*, 46(2), 163-192. <https://doi.org/10.1177/0013916512454730>
- Turner, J.C. (1991). *Social Influence*. Belmont, CA: Thomson Brooks/Cole.
- Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. (1987). *Rediscovering the social group: A self-categorization theory*. Basil Blackwell.
- Umweltbundesamt. (2023, 9. August). *Umweltbewusstsein in Deutschland*. <https://www.umweltbundesamt.de/themen/nachhaltigkeit-strategien-internationales/umweltbewusstsein-in-deutschland>
- Venghaus, S., Henseleit, M., & Belka, M. (2022). The impact of climate change awareness on behavioral changes in Germany: changing minds or changing behavior? *Energy, Sustainability and Society*, 12(1). <https://doi.org/10.1186/s13705-022-00334-8>

Zhu, X., & Lu, C. (2017). Re-evaluation of the New Ecological Paradigm scale using item response theory. *Journal of Environmental Psychology*, 54, 79-90.

<https://doi.org/10.1016/j.jenvp.2017.10.005>

## Appendix

Figure 1: Condition 1 Vegan



**ONLINE FORUM - BÜRGERBETEILIGUNG**

**Offene Frage an die Öffentlichkeit:  
Was kann in Deutschland getan werden, um nachhaltiger zu werden?**

**USER1:** 17:12h  
Klimawandel ist ein großes Problem, aber ich denke, auch das System muss sich ändern, damit Einzelpersonen wirklich in der Lage sind, sich zu ändern. Zum Beispiel würde ich öffentliche Verkehrsmittel häufiger nutzen, wenn es eine gute Option gäbe, aber der Bus, der nur einmal pro Stunde fährt, ist einfach nicht ausreichend. Wenn es mehr Busse oder Züge gäbe und wenn es günstiger wäre, denke ich, würden die Menschen vom Auto auf öffentliche Verkehrsmittel umsteigen.

**USER2 :** 17:19h  
Ich denke, ein großer Aspekt, der das Klima beeinflusst und den wir alle als Individuen kontrollieren können und müssen, ist unser Konsum von Lebensmitteln. Die Fleisch- und Milchindustrie ist sehr schädlich für die Umwelt, weshalb ich mich entschieden habe, nur noch pflanzliche Produkte zu essen. Auf diese Weise habe ich einen geringeren ökologischen Fußabdruck, es werden weniger Ressourcen verbraucht, und durch den Verzicht auf tierische Produkte ist kein Roden von Wäldern für die Viehzucht erforderlich. Deshalb denke ich, dass jeder vegan leben sollte. Für mich fühlt es sich unverantwortlich an, in dieser Zeit noch Fleisch zu essen.

**USER3:** 17:23h  
Ich bin ganz dafür, das Klima zu verbessern, aber die Regierung sollte auch daran denken, die großen Umweltverschmutzer zu besteuern. Dass ich den Bus nehme oder einen Burger esse, ist im Vergleich zu all den Emissionen, die sie in die Luft blasen, einfach nichts. Die Auswirkungen individueller Handlungen können kaum mit den massiven Emissionen verglichen werden, die von den großen Industrien freigesetzt werden...

**USER4:** 17:26h  
Und was ist mit anderen Ländern wie China, den Vereinigten Staaten oder Russland? Wir versuchen hier in Deutschland wirklich, Dinge zu verändern, aber macht es einen Unterschied, wenn sie einfach tun können, was sie wollen, mit ihren großen Industrien?

**USER2:** 17:31h  
Ich stimme zu, dass sich das System ändern muss, aber wir tragen auch Verantwortung. Wir sind Teil des Systems, und wenn wir alle unser Verhalten ändern, wird der Rest folgen. Wir alle haben die Verantwortung, bessere Entscheidungen zu treffen. Jede Entscheidung, die wir treffen, führt entweder dazu, den Planeten mehr zu zerstören oder ihn zu schützen. Und indem wir vegan leben, helfen wir dem Planeten.

**Deine Antwort...**

Figure 2: Condition 2 Both



**ONLINE FORUM - BÜRGERBETEILIGUNG**

Offene Frage an die Öffentlichkeit:  
Was kann in Deutschland getan werden, um nachhaltiger zu werden?

**USER1:** 17:12h  
Klimawandel ist ein großes Problem, aber ich denke, auch das System muss sich ändern, damit Einzelpersonen wirklich in der Lage sind, sich zu ändern. Zum Beispiel würde ich öffentliche Verkehrsmittel häufiger nutzen, wenn es eine gute Option gäbe, aber der Bus, der nur einmal pro Stunde fährt, ist einfach nicht ausreichend. Wenn es mehr Busse oder Züge gäbe und wenn es günstiger wäre, denke ich, würden die Menschen vom Auto auf öffentliche Verkehrsmittel umsteigen.

**USER2:** 17:19h  
Ich denke, ein großer Aspekt, der das Klima beeinflusst und den wir alle als Individuen kontrollieren können und müssen, ist unser Konsum von Lebensmitteln. Die Fleisch- und Milchindustrie ist sehr schädlich für die Umwelt, weshalb ich mich entschieden habe, nur noch pflanzliche Produkte zu essen. Auf diese Weise habe ich einen geringeren ökologischen Fußabdruck, es werden weniger Ressourcen verbraucht, und durch den Verzicht auf tierische Produkte ist kein Roden von Wäldern für die Viehzucht erforderlich. Deshalb denke ich, dass jeder vegan leben sollte. Für mich fühlt es sich unverantwortlich an, in dieser Zeit noch Fleisch zu essen.

**USER3:** 17:23h  
Ehrlich gesagt, kaufe ich den ganzen Hype um den Klimawandel nicht ab. Das Wetter war schon immer unberechenbar, und die Leute sagen seit Jahren, dass die Welt untergeht. Es gibt tatsächlich Probleme in dieser Welt, auf die sich die Regierung konzentrieren sollte. Ich sehe keinen Grund, meinen Lebensstil zu ändern oder anders zu essen, nur weil einige Leute behaupten, das Klima ändert sich. Es ist ein natürlicher Zyklus. Diese sogenannten Naturschützer wollen sich nur besser fühlen. Ich werde mein Leben so weiterleben wie bisher.

**USER4:** 17:26h  
Ich bin ganz dafür, das Klima zu verbessern, aber die Regierung sollte auch daran denken, die großen Umweltverschmutzer zu besteuern. Dass ich den Bus nehme oder einen Burger esse, ist im Vergleich zu all den Emissionen, die sie in die Luft blasen, einfach nichts. Die Auswirkungen individueller Handlungen können kaum mit den massiven Emissionen verglichen werden, die von den großen Industrien freigesetzt werden...

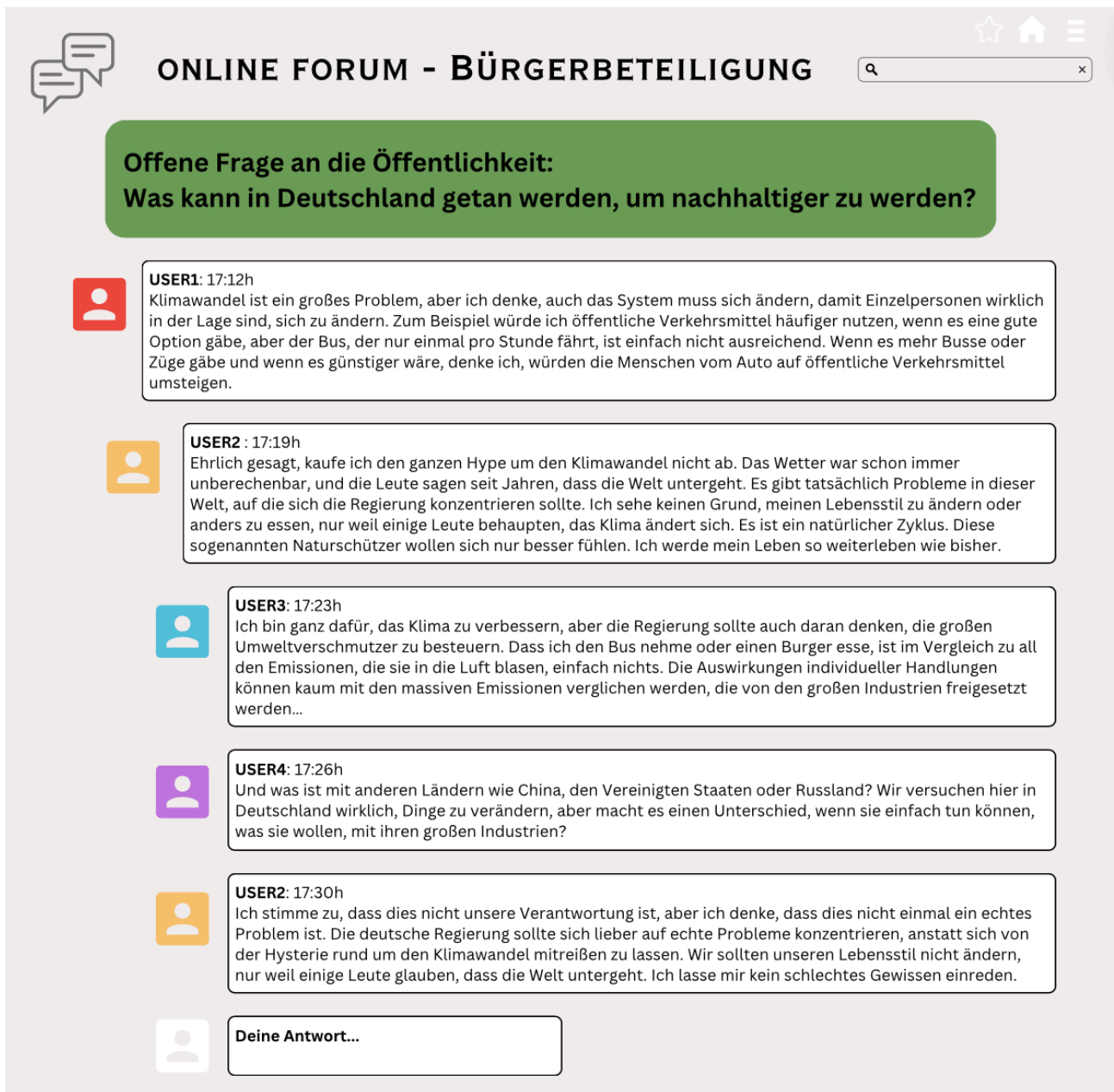
**USER5:** 17:28h  
Und was ist mit anderen Ländern wie China, den Vereinigten Staaten oder Russland? Wir versuchen hier in Deutschland wirklich, Dinge zu verändern, aber macht es einen Unterschied, wenn sie einfach tun können, was sie wollen, mit ihren großen Industrien?

**USER3:** 17:30h  
Ich stimme zu, dass dies nicht unsere Verantwortung ist, aber ich denke, dass dies nicht einmal ein echtes Problem ist. Die deutsche Regierung sollte sich lieber auf echte Probleme konzentrieren, anstatt sich von der Hysterie rund um den Klimawandel mitreißen zu lassen. Wir sollten unseren Lebensstil nicht ändern, nur weil einige Leute glauben, dass die Welt untergeht. Ich lasse mir kein schlechtes Gewissen einreden.

**USER2:** 17:34h  
Ich stimme zu, dass sich das System ändern muss, aber wir tragen auch Verantwortung. Wir sind Teil des Systems, und wenn wir alle unser Verhalten ändern, wird der Rest folgen. Wir alle haben die Verantwortung, bessere Entscheidungen zu treffen. Jede Entscheidung, die wir treffen, führt entweder dazu, den Planeten mehr zu zerstören oder ihn zu schützen. Und indem wir vegan leben, helfen wir dem Planeten.

Deine Antwort...

Figure 3: Condition 3 Denier



**ONLINE FORUM - BÜRGERBETEILIGUNG**

Offene Frage an die Öffentlichkeit:  
Was kann in Deutschland getan werden, um nachhaltiger zu werden?

**USER1:** 17:12h  
Klimawandel ist ein großes Problem, aber ich denke, auch das System muss sich ändern, damit Einzelpersonen wirklich in der Lage sind, sich zu ändern. Zum Beispiel würde ich öffentliche Verkehrsmittel häufiger nutzen, wenn es eine gute Option gäbe, aber der Bus, der nur einmal pro Stunde fährt, ist einfach nicht ausreichend. Wenn es mehr Busse oder Züge gäbe und wenn es günstiger wäre, denke ich, würden die Menschen vom Auto auf öffentliche Verkehrsmittel umsteigen.

**USER2:** 17:19h  
Ehrlich gesagt, kaufe ich den ganzen Hype um den Klimawandel nicht ab. Das Wetter war schon immer unberechenbar, und die Leute sagen seit Jahren, dass die Welt untergeht. Es gibt tatsächlich Probleme in dieser Welt, auf die sich die Regierung konzentrieren sollte. Ich sehe keinen Grund, meinen Lebensstil zu ändern oder anders zu essen, nur weil einige Leute behaupten, das Klima ändert sich. Es ist ein natürlicher Zyklus. Diese sogenannten Naturschützer wollen sich nur besser fühlen. Ich werde mein Leben so weiterleben wie bisher.

**USER3:** 17:23h  
Ich bin ganz dafür, das Klima zu verbessern, aber die Regierung sollte auch daran denken, die großen Umweltverschmutzer zu besteuern. Dass ich den Bus nehme oder einen Burger esse, ist im Vergleich zu all den Emissionen, die sie in die Luft blasen, einfach nichts. Die Auswirkungen individueller Handlungen können kaum mit den massiven Emissionen verglichen werden, die von den großen Industrien freigesetzt werden...

**USER4:** 17:26h  
Und was ist mit anderen Ländern wie China, den Vereinigten Staaten oder Russland? Wir versuchen hier in Deutschland wirklich, Dinge zu verändern, aber macht es einen Unterschied, wenn sie einfach tun können, was sie wollen, mit ihren großen Industrien?

**USER2:** 17:30h  
Ich stimme zu, dass dies nicht unsere Verantwortung ist, aber ich denke, dass dies nicht einmal ein echtes Problem ist. Die deutsche Regierung sollte sich lieber auf echte Probleme konzentrieren, anstatt sich von der Hysterie rund um den Klimawandel mitreißen zu lassen. Wir sollten unseren Lebensstil nicht ändern, nur weil einige Leute glauben, dass die Welt untergeht. Ich lasse mir kein schlechtes Gewissen einreden.

Deine Antwort...